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(54) Title: METHODS DETECTING, CHARACTERISING AND MONITORING HYDROCARBON RESERVOIRS

(57) Abstract: The present invention relates to a method of detecting, characterising or monitoring a hydrocarbon source, which method comprises the genotypic analysis of a sample for the presence of one or more thermophilic or extremophilic microorganisms and in particular to the generation of microbiological profiles of samples and to the comparison of these profiles with profiles from reference samples. Also provided are oligonucleotides for use in said method.

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 03/03864

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C12Q1/68

According to International Patent Classification (IPC) or to both national classification and IPC.

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, BIOSIS, EMBL, WPI Data, EMBASE, MEDLINE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>ORPHAN V J ET AL: "Culture-dependent and culture-independent characterization of microbial assemblages associated with high-temperature petroleum reservoirs" APPLIED AND ENVIRONMENTAL MICROBIOLOGY, vol. 66, no. 2, February 2000 (2000-02), pages 700-711, XP002273778 & ISSN: 0099-2240 abstract page 701, left-hand column, paragraph 2 - page 705, left-hand column, paragraph 1 table 1</p> <p style="text-align: center;">----- -/-</p>	<p>1-4, 6-11,15</p>

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

24 March 2004

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INTERNATIONAL SEARCH REPORT

Inter Application No
PCT/GB 03/03864

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>VAN BORM STEVEN ET AL: "Group-specific polymerase chain reaction amplification of SSU rRNA-encoding gene fragments from 12 microbial taxa"</p> <p>MOLECULAR ECOLOGY NOTES; vol. 2, no. 3, 3 September 2002 (2002-09-03), pages 356-359, XP002273779 & ISSN: 1471-8278 the whole document</p>	1-12,15
A	<p>DELONG ET AL: "Archaea in coastal marine environments"</p> <p>PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF USA, NATIONAL ACADEMY OF SCIENCE. WASHINGTON, US, vol. 89, June 1992 (1992-06), pages 5685-5689, XP002110100 ISSN: 0027-8424 cited in the application the whole document</p>	1-12,15
A	<p>TESKE A ET AL: "Distribution of sulfate-reducing bacteria in a stratified Fjord (Mariager Fjord, Denmark) as evaluated by most-probable-number counts and denaturing gradient gel electrophoresis of PCR-amplified ribosomal DNA fragments"</p> <p>APPLIED AND ENVIRONMENTAL MICROBIOLOGY, WASHINGTON, DC, US, vol. 62, no. 4, April 1996 (1996-04), pages 1405-1415, XP002270204 ISSN: 0099-2240 cited in the application the whole document</p>	1-12,15
A	<p>EP 0 502 271 A (STANDARD OIL CO OHIO) 9 September 1992 (1992-09-09) the whole document</p>	1-12,15

INTERNATIONAL SEARCH REPORT

ational application No.
PCT/GB 03/03864

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-12 (completely), 15 (partially)

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

Invention 1: claims 1-12 (all completely) and 15 (partially)

A method of detecting, characterising or monitoring a hydrocarbon zone comprising the genotypic analysis of a sample for the presence of one or more thermophilic or extremophilic microorganisms.

Invention 2: claims 13, 14 (both completely) and 15 (partially)

A method of determining the depth of a hydrocarbon zone comprising the genotypic analysis of a sample for the presence of one or more thermophilic or extremophilic microorganisms.

Invention 3: claims 16-20 (all partially)

An oligonucleotide as defined in SEQ ID No. 5 or a functional equivalent variant thereof; a solid support having attached thereto said oligonucleotide; a kit comprising said oligonucleotide.

Inventions 4-17: claims 16-20 (all partially)

Idem as invention 3, but each of the inventions 4-17 restricted to one of the SEQ ID Nos. 6-19.

INTERNATIONAL SEARCH REPORT

Internal Application No.

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0502271 A	09-09-1992	EP 0502271 A1	09-09-1992